Post-Las Conchas Fire Supplemental Risk Results

Exposures to Cesium-137 in Sediments

July 6, 2012

On July 3, 2012 we reviewed some conclusions developed by NMDOH based on the initial post-Las Conchas fire risks. These risks were calculated using the maximum soil, water, or sediment concentrations. We decided that a more appropriate risk message would be based on the average risks post-fire. Of the scenarios we reviewed on July 3rd only the cesium-137 risks for recreators would have relevant data for evaluating average risks. The farm soil scenarios have relatively few results per field and therefore maximum results reflect the best resolution of exposures at this time.

The cesium-137 sediment results were pooled into groups that reflected the highest exposures (Peralta Canyon) and the most likely exposure area (Rio Grande). Sediment background risks (Pajarito Plateau) are calculated for comparison. Table 1 summarizes these results and shows that the risks in Peralta Canyon range from 2e-5 for the maximum to 2e-6 for the average (and CTE). Total radionuclides risks for the recreational scenario also reflect exposures from potassium-40 and thorium-228 (below background risks). Average risks from cesium-137 for recreational exposures from Peralta sediments are basically equal to 1e-5. We are assuming that one recreates in the vicinity of the post-fire sediment deposits and people do not use areas outside of the floodplains. So it seems likely that exposures to cesium-137 in sediments are overstated. Table 2 provides additional information on the UCLs and means calculated using the EPA ProUCL v4.1.00 software. Box plots of cesium-137 in sediment and soil are provided in Figure 1. Plots for potassium-40 and strontium-90 appear in Figures 2, 3.

Table 1. Cesium-137 Concentrations and Risks and Total Radionuclide Risks for the Recreational Scenario

Sediment Data Group	Conc. (pCi/g)	RME risks		CTE risks	
		Cs-137 only	Total risks	Cs-137 only	Total risks
Overall maximum*	4.4	2.0E-05	9.3E-05	4.6E-06	2.1E-05
Peralta UCL	3.1	1.4E-05	8.7E-05	3.3E-06	1.9E-05
Peralta mean	2.1	9.6E-06	8.3E-05	2.2E-06	1.8E-05
Rio Grande UCL	1.0	4.6E-06	7.8E-05	1.1E-06	1.7E-05
Rio Grande mean	0.57	2.6E-06	7.6E-05	6.0E-07	1.7E-05
Background UCL	0.48	2.2E-06	7.5E-05	5.1E-07	1.7E-05
Background mean	0.21	9.6E-07	7.4E-05	2.2E-07	1.6E-05

* From Peralta Canyon

Table 2. Cesium-137 Concentrations and Risks and Total Radionuclide Risks for the Recreational Scenario

Sediment Data Group	count	max	mean	UCL	Statistical distribution	UCL method
Background	24	1.28	0.211	0.484	No Discernable Distribution	Use 95% Chebyshev (Mean, Sd) UCL
Peralta	6	4.4	2.117	3.135	Normal	Use 95% Student's-t UCL
LANL west boundary	10	2.75	1.569	1.95	Normal	Use 95% Student's-t UCL
LANL onsite or downstream	37	3.58	1.099	1.606	No Discernable Distribution	Use 95% Chebyshev (Mean, Sd) UCL
Rio Grande	17	1.56	0.572	1.012	Gamma	Use 95% Approximate Gamma UCL

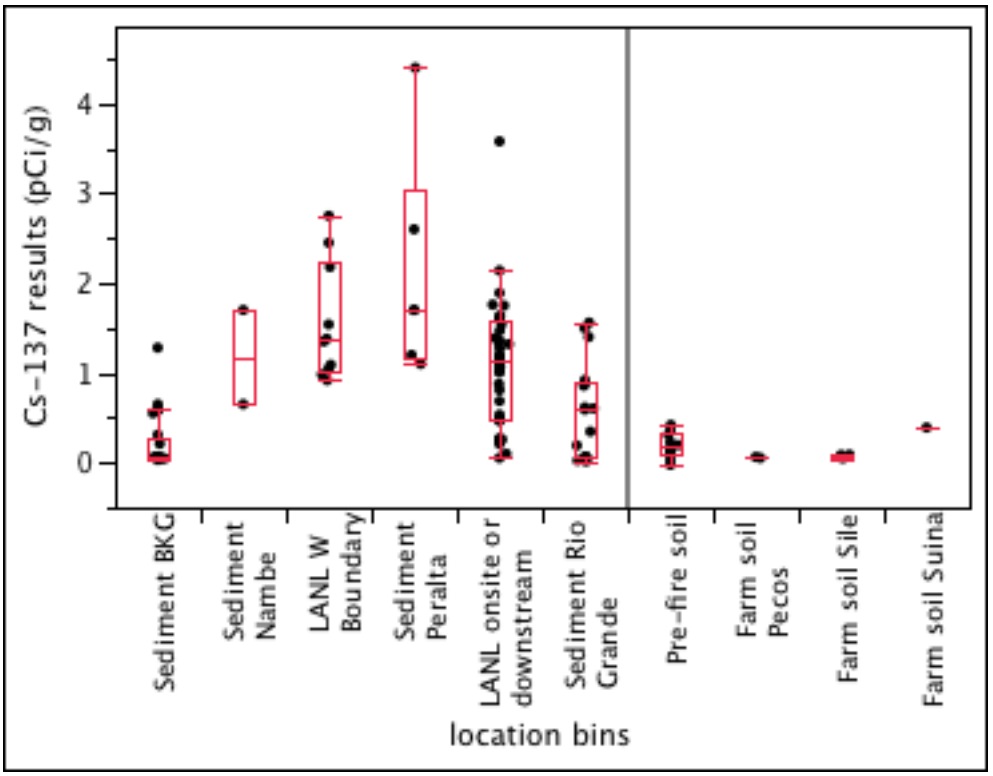

Figure 1. Box plot of ceium-137 in post-fire sediment and farm soil with Pajarito Plateau sediment and pre-fire soil for comparison.

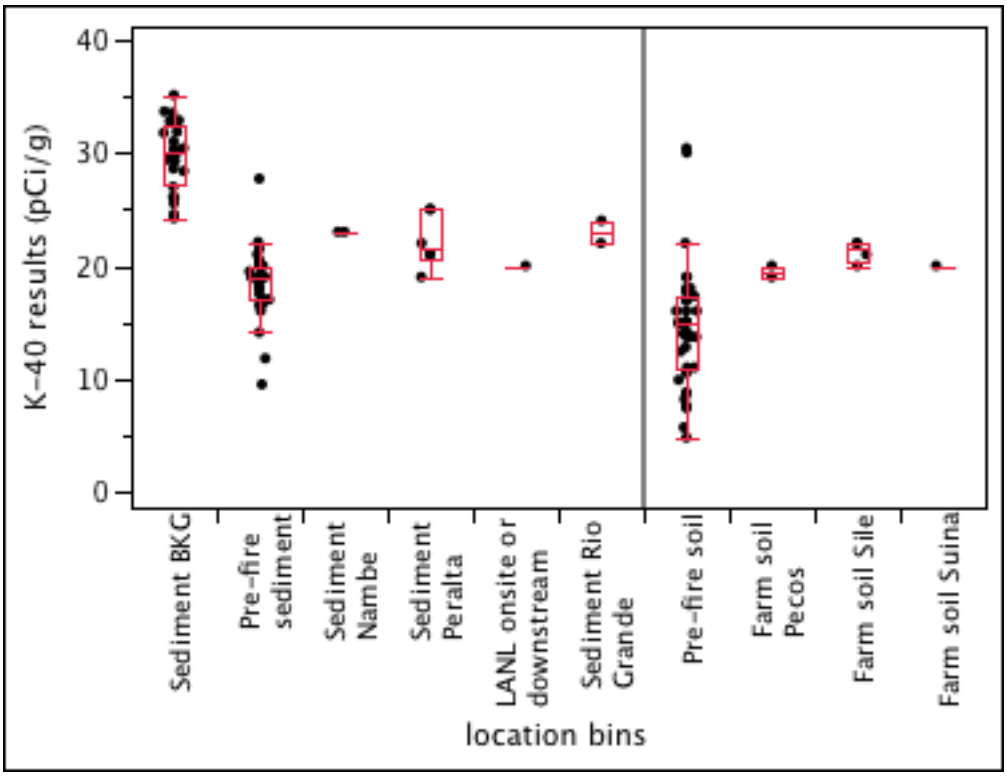

Figure 2. Box plot of potassium-40 in post-fire sediment and farm soil with Pajarito Plateau sediment and pre-fire soil for comparison.

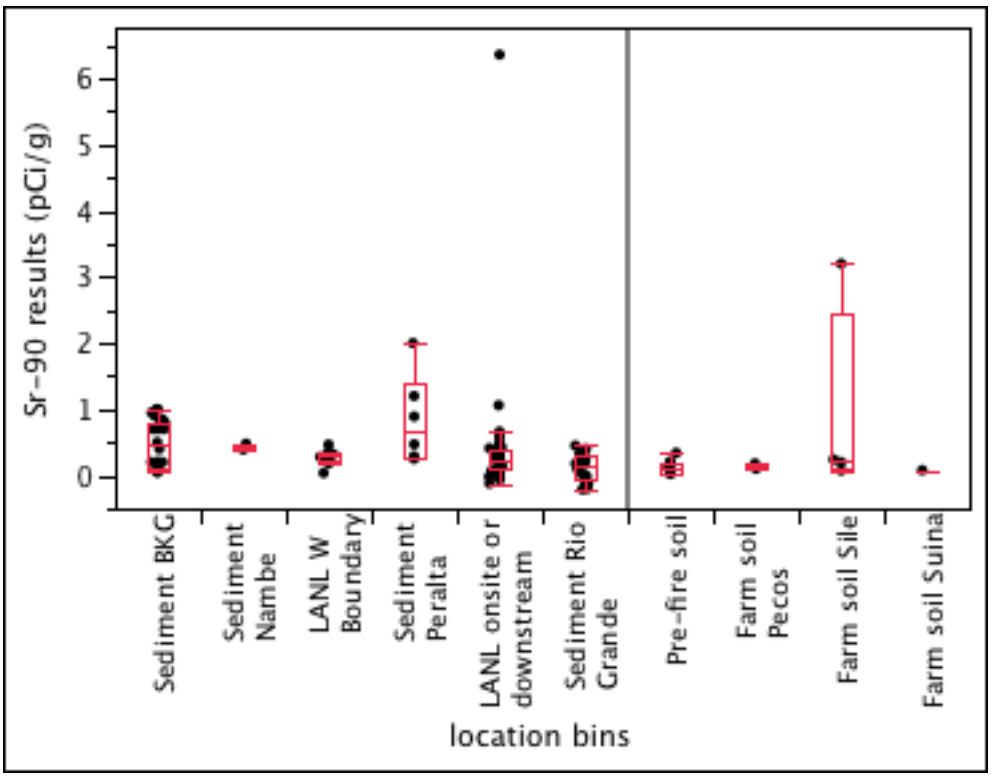

Figure 3. Box plot of strontium-90 in post-fire sediment and farm soil with Pajarito Plateau sediment and pre-fire soil for comparison.